Appendix C: The Potential Use of Electronic Monitoring Technology to Monitor Catch and Discards in the West Coast Groundfish Fisheries

The last several years have seen major advances in the development and application of electronic monitoring (EM) technology in fisheries management. This technology involves the placement of tamper-proof automated computing systems aboard fishing vessels to independently monitor a variety of activities. An important advantage of EM technology is its ability to provide accurate, timely and verifiable fisheries data of equivalent or better quality and lower cost than that provided by other monitoring methods such as the deployment of at-sea observers (McElderry et al., 2002). One widely used example of EM technology is a VMS (Vessel Monitoring System), an automated real-time, satellite-based tracking system operated by NOAA Fisheries and the U.S. Coast Guard that obtains near-continuous position reports from vessels at sea.

Another application of EM technology in fisheries management is catch monitoring. For example, Archipelago Marine Research, Ltd. has developed an automated catch and effort monitoring system for longline fisheries (personal communication, Howard McElderry, Archipelago Marine Research, Ltd., October 2003). This system involves the installation of a video camera above the deck of a fishing vessel. The camera transmits images of harvesting activities to a shoreside facility, where trained fishery technologists are able to count, identify the species, and estimate the weight of each fish as it comes on board. Because all fish caught are counted there is no need to monitor discards. Discard amounts can be estimated by deducting landed weight from the total catch estimate derived from the EM system. Tests performed with this equipment show that it can be 98% as accurate as an observer sample and has the advantage over a human observer of capturing a continuous and comprehensive record of catch during an entire trip. In addition, onboard camera surveillance gives end users the ability to replay imagery and control viewing speed (McElderry et al., 2002). This capability may be particularly useful during high catch rates where fish sorting is fast and involves several crew.

A second example of EM technology that collects catch information is the video recording system developed by Digital Observer, Inc. (personal communication, Mark Buckley, Digital Observer LLC, November 2003). This system is being designed to monitor catches and discards of halibut (a prohibited species) on U.S. trawl vessels operating in the Alaska groundfish fisheries. The system includes specialized computer software that can identify species and estimate weights of individual fish. Each fish is placed in a light-proof box and videoed using specialized internal lighting. The software is capable of differentiating almost all fish species found in North Pacific trawl catches. Length, width and girth measurements obtained from the digitized image are used to estimate the weight of each fish.

Although a pilot test of EM technology has been conducted to monitor the disposition of catch in the Oregon shoreside hake fishery (McElderry et al., 2002), the capability of this technology to accurately monitor catch and discards on trawl vessels has not yet been fully assessed. However, one can envision a system that might prove effective in the near future. For instance, a possible system might employ two or more digital motion-activated cameras with night vision capability. One camera would monitor activity on the entire fishing deck of the vessel. A second camera would be installed over a portion of the deck specifically designated as a discard area. This designated area would be the only location on the vessel from which harvested fish could be

legally thrown overboard. The discarding of fish at any other location on the vessel would be detected by the camera monitoring activity on the entire working deck and would constitute a fishing violation. Fish discarded at the designated station would be identified and counted by means of some variant of the existing EM technology described above. Extensive tests would have to be performed to assess the effectiveness of this or some other automated system for recording catch and discards. However, if such a system were successfully developed, it would undoubtedly be far less costly than deploying observers aboard vessels. It is estimated that the annual costs of operating EM technology designed for the purpose of recording catch and discards on trawl vessels could be as low as $10,000 per vessel. In the short term, this may be more expensive than an at-sea observer program. Over the long term, however, with equipment cost amortized over the life of the equipment, electronic monitoring becomes a much cheaper option, ranging from 20-60 percent of an at-sea observer program depending upon various issues including program structure and size and the data analysis requirements (McElderry et al., 2002).